

CHEMISTRY 11

CHEMICAL REACTIONS LAB: FROM COPPER TO COPPER

<http://www.youtube.com/watch?v=2UsRXB3O9D8>

Part A: The Preparation of Copper (II) Nitrate

1. Follow safety procedures to carry out reaction in fumehood.
2. Zero the dial-o-gram balance.
3. Weigh about 0.10g of copper flakes.
4. Place the copper flakes into a 50 mL beaker or Erlenmeyer flask
5. Measure 2.0 mL of concentrated nitric acid, HNO_3 (aq), to the flask in the fumehood.
6. Warm the beaker/flask on a hot plate until the chemical reaction is complete (all the Cu is dissolved) and the evolution of the brown NO_2 (g) ceases.
7. Cool the beaker/flask in a cold water bath.
8. Measure 2.0 mL (video suggests 25 ml) of distilled water using a graduated cylinder.
9. Add the distilled water to the beaker containing the copper (II) nitrate solution.

Part B: The Preparation of Copper (II) Hydroxide

10. Measure 4.0 mL of copper (II) nitrate solution using a graduated cylinder and pour it into a 50 mL beaker.
11. At the lab bench, while stirring with a glass rod, add sodium hydroxide solution (~ 2 ml), one dropperful at a time into the beaker until a piece of red litmus paper turns blue. Place the tip of the glass rod onto the litmus paper. Do not put the red litmus paper in the solution.

Part C: Preparation of Copper (II) Oxide

13. When all of the light blue precipitate has reacted to form the black precipitate, heat the mixture from (step 11) above on a hot plate until a black precipitate is formed (~ 10 min).
14. When all of the light blue precipitate has reacted, cool the flask in a cold water bath for 1 -2 minutes. (the video filters the copper (II) oxide)

Part D: Preparation of Copper (II) Sulfate Solution

15. Measure 6.0 mL of hydrogen sulfate solution (sulfuric acid) in a graduated cylinder.
16. Add the above to the beaker and stir until all the black precipitate has dissolved.

Part E: Preparation/Regeneration of Copper Metal

17. In a well ventilated area, weigh about 0.8g zinc metal powder on the balance.
18. Add the powdered zinc to the solution of copper (II) sulfate, and stir until the blue colour disappears (it will turn colourless).
19. The copper metal will float or sink to the bottom, depending on the size of the pieces.
20. Wash and put away all equipment and material. Leave your beaker with the final products on the teacher's lab bench.
21. When the reaction is complete, carefully add 6 mL of sulfuric acid to the flask while stirring or swirling the solution. This removes any unreacted zinc but does not affect the copper metal.
22. Carefully decant the liquid into a clean waste container. Wash the copper metal carefully several times with water and allow to dry. Return the copper metal to your teacher.